

REMARKS

The present invention relates to a vinyl ether group-containing (meth) acrylic ester composition, and methods of producing, transporting, storing, transferring and purifying same.

In the Office Action dated July 26, 2004, claims 1-21 were rejected under 35 U.S.C. § 103(a) based on Preparation of Tailor-Made Multifunctional Propenyl Ethers by Radical Copolymerization of 2-(1-Propenyl)oxyethyl Methacrylate, *Macromolecules* 1999, 32, 55-59 (Vaneteenkiste) in view of Bauer.

In the present Amendment, claims 1 and 3 have been amended to recite that --the total amount of the radical polymerization inhibitor and the vinyl ether group-containing (meth) acrylic ester is not less than 95% by weight relative to the vinyl ether group-containing (meth) acrylic ester composition--. This amendment is supported by the specification, for example, page 14, 3rd full paragraph (see page 2 of Amendment filed April 28, 2004), page 33, 1st full paragraph, and the working examples.

Claims 2 and 16 have been amended to recite that --the total amount of the radical polymerization inhibitor, the basic compound and the vinyl ether group-containing (meth) acrylic ester is not less than 95% by weight relative to the vinyl ether group-containing (meth) acrylic ester composition--. This amendment is supported by the specification, for example, page 14, 3rd full paragraph (see page 2 of Amendment filed April 28, 2004), page 33, 1st and 3rd full paragraphs, and the working examples.

Claims 5 to 7 have been amended to replace “handling” with --transporting, storing or transferring--. This amendment is supported by the specification, for example, at page 15, lines 10-15.

Claim 8 has been amended to further define R^3 in formula (1). This amendment is supported by the specification, for example, on page 9, lines 21-25. Claim 8 has also been amended to correct an obvious error in formula (5). See page 20 of the Amendment under 37 C.F.R. § 1.114(c) filed April 28, 2004.

With regard to the §103 rejection, Applicants respectfully submit that the present invention is patentable over the cited references, for at least the following reasons.

With respect to the claimed limitation of water and oxygen content, it was asserted that “One of ordinary skill would recognize that the claimed limitation of water and oxygen content are necessarily met by this reaction [of Vaneteenkiste].” See page 2 of the Office Action, last full paragraph.

Applicants respectfully disagree. Vaneteenkiste does not specifically describe or fairly suggest the oxygen content during the reaction. If the reaction of Vaneteenkiste is carried out under an ordinary air atmosphere, it does not satisfy the oxygen content presently claimed because the oxygen content in ordinary air is about 21%.

Further, the present invention is achieved by optimization of the oxygen content, and shows unexpectedly superior results such that the polymerization in the above reaction system can be effectively inhibited and the desired vinyl ether group-containing (meth) acrylic ester can be produced in high yields as compared to the prior art. These superior results are clearly shown by the comparison of Examples 122 and 123 of the present specification. Vanteenkiste does not disclose or suggest the importance of these features.

With respect to the polymerization inhibitor, the Office Action asserted that “Vansteenkiste teaches the claimed composition, given the broadest reasonable interpretation of the word ‘end product.’” See page 3 of the Office Action, last paragraph.

Applicants respectfully disagree. In general, the phrase “end product” means a desired product which contains so small amount of impurities that it can be used in various uses without further purification process.

The crude product of Vansteenkiste before the purification process contains a polymerization inhibitor and other impurities which would render it difficult or impossible to use in other uses without purification. Further, the Vansteenkiste crude product does not satisfy the presently claimed ratios of the radical polymerization inhibitor and the vinyl ether group-containing (meth) acrylic ester in claims 1 and 3, nor those of the radical polymerization

inhibitor, the basic compound and the vinyl ether group-containing (meth) acrylic ester in claims 2 and 16, relative to the vinyl ether group-containing (meth) acrylic ester composition.

Furthermore, a polymerization inhibitor is generally used to restrict the undesirable polymerization reaction during the reaction. As also stated in Bauer, "It is often very helpful to have present during the reaction a small amount of a polymerization inhibitor, such as β -naphthol."

On the other hand, the present inventors achieved the present invention by finding that a radical polymerization inhibitor is useful for stabilization of vinyl ether group-containing (meth) acrylic esters. Bauer neither discloses nor suggests such aspect.

With respect to the term "handling," as noted above, Applicants have amended claims 5 to 7 to replace "handling" with --transporting, storing or transferring--. This recitation clearly does not include the drying and vacuum steps disclosed in Vansteenkiste.

In the last sentence at page 4 of the Office Action, it is stated that "One of ordinary skill would expect that the oxygen requirements to met during this [vacuum] step."

Applicants respectfully disagree. Specifically, in the reaction for synthesis of 2-(1-propenyl)oxyethyl methacrylate in Vensteenkiste, the reaction product is purified by vacuum distillation. By this procedure, oxygen in the gaseous phase is removed due to the decrease in

pressure and replacement of oxygen with vapor of the product. Thus, some operation such as introduction of oxygen from outside or generation of oxygen gas during vacuum distillation would be necessary to keep the oxygen content in a certain region.

However, Vensteenkiste does not disclose such operation. Rather, Vensteenkiste's vacuum distillation is carried out with continuous decompression by a vacuum pump. Thus, in the vessel in which the product (2-(1-propenyl)oxyethyl methacrylate) is contained, the air which was in the gaseous phase of reaction vessel is continuously suctioned out. That is, the oxygen concentration in the gaseous phase of the vessel decreases with the passage of time. Accordingly, Applicants respectfully submit that the oxygen content in Vansteenkiste is lower than the lower limit (0.01% by volume) specified in the present claims 5 and 7.

In the present invention, the lower limit of the oxygen content is specified to prevent polymerization due to the absence of oxygen, as described at page 22, line 34 to page 23, line 2 of the present specification. By maintaining the lower limit of oxygen content, it becomes possible to transport, store and transfer a vinyl ether group-containing (meth) acrylic ester in a stable manner. Vansteenkiste neither discloses nor suggests such aspect.

In view of the foregoing, Applicants respectfully submit that the present invention is not obvious over the cited references and the rejection should be withdrawn.

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No.: 09/982,861

Attorney Docket Q66372

In view of the above, reconsideration and allowance of 1-3, 5-8 and 10-21 are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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